CLAIMS

What is claimed is:

1.   A method for delivering of a plurality of RDMA messages, the method comprising the

steps of:

    placing each out-of-order RDMA message to a buffer;

    storing information regarding each out-of-order RDMA message on a per TCP hole basis;

and

    delivering the plurality of RDMA messages in-order.

2.   The method of claim 1, wherein, for an RDMA Read Request message, the storing step

includes:

    storing a number of pending RDMA Read Response messages waiting for a doorbell ring

in a connection context on a per TCP hole basis; and

    ringing the doorbell of a network interface controller (NIC) that each of the number of

pending RDMA read response messages have been posted to a respective work queue element

(WQE) of a read queue upon closing of a respective TCP hole.

3.   The method of claim 2, further comprising the step of processing each WQE.

4.   The method of claim 1, wherein, for RDMA Send type messages, the delivery step

includes, for each RDMA Send message of a TCP hole, placing RDMA Send message specific

information to a work queue element (WQE) associated with the respective RDMA Send

message.

5.   The method of claim 4, further comprising the step of placing the CQE to a completion

queue (CQ) upon closing of the TCP hole.

6.   The method of claim 4, wherein a number of CQEs is equal to a number of RDMA Send

messages of the TCP hole.

7.   The method of claim 4, wherein RDMA Send message specific information is retrieved

from a respective WQE upon a Poll-for-Completion request by an RDMA verb interface.

8.   The method of claim 1, wherein, for RDMA Read Response type messages, the method

further comprises the steps of:

        storing a number of completed RDMA Read Response messages on a per TCP hole basis;

and

        reporting completion of RDMA Read work requests upon closing of the TCP hole.

9.   A system for delivering of a plurality of RDMA messages, the method comprising the

steps of:

means for placing each out-of-order RDMA message to a buffer;

means for storing information regarding each out-of-order RDMA message on a per TCP

hole basis; and

means for delivering the plurality of RDMA messages in-order.

10.   The system of claim 9, wherein, for an RDMA Read message, the storing means includes:

means for storing a number of pending RDMA Read Response messages waiting for a

doorbell ring on a per TCP hole basis; and

means for ringing the doorbell of the delivery means that each of the number of pending

RDMA Read Response messages have been posted to a respective work queue element (WQE)

of a read queue upon closing of a respective TCP hole.

11.   The system of claim 9, wherein, for RDMA Send type messages, the delivery means

includes, for each RDMA Send message of a TCP hole, placing RDMA Send message specific

information to a work queue element (WQE) associated with the respective RDMA Send

message.

12.   The system of claim 11, further comprising means for placing the CQE to a completion

queue (CQ) upon closing of the TCP hole.

13.   The system of claim 11, wherein a number of CQEs is equal to a number of RDMA Send messages of the TCP hole.

14.   The system of claim 11, wherein the RDMA Send message specific information is retrieved from a respective WQE upon a Poll-for-Completion request by an RDMA verb interface.

15.   The system of claim 9, further comprising:

means for storing a number of completed RDMA Read Response messages on a per TCP hole basis; and

means for reporting completion of RDMA Read work requests upon closing of the TCP hole.

16. A computer program product comprising a computer useable medium having computer readable program code embodied therein for delivering of a plurality of RDMA messages, the program product comprising:

program code configured to place each out-of-order RDMA message to a buffer;

program code configured to store information regarding each out-of-order RDMA message on a per TCP hole basis; and

program code configured to deliver the plurality of RDMA messages in-order.

17. The program product of claim 16, wherein, for an RDMA Read message, the storing program code includes:

program code configured to store a number of pending RDMA Read Response messages waiting for a doorbell ring in a connection context on a per TCP hole basis; and

program code configured to ring the doorbell of a network interface controller (NIC) that each of the number of pending RDMA Read Response messages have been posted to a respective work queue element (WQE) of a read queue upon closing of a respective TCP hole.

18. The program product of claim 16, wherein, for RDMA Send type messages, the delivery program code includes program code configured to placing RDMA Send message specific information to a work queue element (WQE) associated with each RDMA Send message of a TCP hole.

19. The program product of claim 18, further comprising program code configured to place the CQE to a completion queue (CQ) upon closing of the TCP hole.

20. The program product of claim 18, wherein a number of CQEs is equal to a number of RDMA Send messages of the TCP hole.

21. The program product of claim 18, wherein the RDMA Send message specific information is retrieved from a respective WQE upon a Poll-for-Completion request by an RDMA verb interface.

22. The program product of claim 16, further comprising:

program code configured to store a number of completed RDMA Read Response messages on a per TCP hole basis; and

program code configured to report completion of RDMA Read work requests upon closing of the TCP hole.